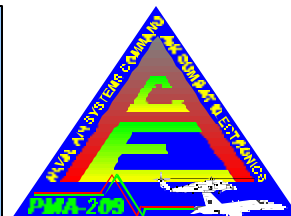


CNS/ATM for Naval Aviation

CNS/ATM is an informal newsletter for the Naval Aviation community produced by PMA-209 and the information presented does not represent any official U.S. Navy or DoD position.

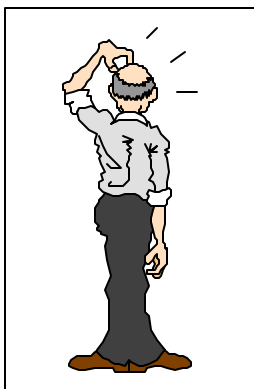
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Purpose

This newsletter provides information to the Naval aviation community concerning requirements and developments in Communications, Navigation and Surveillance / Air Traffic Management (CNS/ATM).

In this first newsletter, we will introduce a few of the changes taking place, and what is being done within Naval aviation to either implement the change or to work around the change. Please notify the editors of any developments that might be of interest to the Naval aviation community along these lines.



PMA-209 has been tasked by N-88 with providing expertise in CNS/ATM. PMA-209 has a number of individuals and contractors supporting this effort.

COMMUNICATIONS

VHF Channel Spacing Reduction to 8.33 kHz

In order to alleviate the frequency congestion problem in Europe, EUROCONTROL is increasing communications capacity by reducing VHF channel separation from 25 kHz to 8.33kHz. All civil aircraft are required to have two 8.33 kHz capable receivers. *The 8.33 kHz capability is being provided in a PMA-209 product, the AN/ARC-210 receiver transmitter R/T-1556 and the R/T-1794.* Military aircraft may use UHF in Europe in lieu of VHF, but this workaround has some major disadvantages. Aircraft using UHF in Europe may experience delays in being handled by ATC and will not be able to hear communications with appropriately 8.33 kHz-equipped

aircraft in their vicinity, a safety concern. NATO has agreed that military aircraft that are frequent users of this airspace should be equipped with 8.33 kHz radios. Additionally, UHF will not be available in Austria east of 12 degrees East. However, in this area, Austria is implementing 8.33 kHz above FL 340 vice FL245. Also, certain areas of Switzerland will not have UHF coverage.

8.33 kHz Requirements (Europe only)

Location	Flight Levels	When
Austria (West of 12E), Belgium, Germany, Luxembourg, the Netherlands, Switzerland	Above FL245	7 October, 1999
France	Above FL195	7 October, 1999
Austria (East of 12E)	Above FL340	7 October, 1999
UK	Above FL245	2000

NAVIGATION

Reduced Vertical Separation Minimums (RVSM)

In an effort to allow more aircraft to fly within a given airspace, the civil aviation community is reducing the vertical separation between aircraft from 2000 ft to 1000 ft between flight level 290 to flight level 410. Aircraft without the required equipment, which includes two independent barometric systems and an autopilot meeting certain accuracy requirements, will be unable to fly at or above FL 290. In October 1997, this was implemented in the North Atlantic between flight levels 330-370.

Current Naval aviation plans are to implement the required changes in transoceanic passenger carrying aircraft such as the C-9, C-20, and C-130. Implementation in other aircraft will be dependent on aircraft missions and capabilities. An obvious workaround for many aircraft may be to remain below FL290, but this leads to increased fuel burn rates and reduced aircraft performance.

The following table provides further information. Note RVSM is not projected as a requirement within the National Air Space (NAS).

Planned Vertical Separation Minimums		
Location	Flight Levels	When
North Atlantic	FL330-370	October, 1997
North Atlantic	FL290-410	April, 2000
Pacific (Dense Airspace)	TBD	February 2000
Western Atlantic Route System	TBD	2001
Europe	FL290-410	November, 2001

Basic Area Navigation (BRNAV) in Europe

ICAO defines navigation as “the art of directing the aircraft from one place to another.” Area Navigation (RNAV) permits the aircraft to navigate along desired flight paths using station-referenced aids or self contained aids. The system computes time to arrive at a selected point in space. Currently, RNAV only applies to lateral navigation although Vertical Navigation may also be implemented.

Required Navigation Performance (RNP) recognizes current navigation systems achieve predictable performance accuracies. RNP requires an aircraft to be within a specific number of nautical miles (nm) of its cleared position (cross track and along track) 95% of the time during the duration of the flight. This accuracy includes positioning error, flight technical error, path definition error, and display error.

EUROCONTROL Standard Document 003-93, Amendment 1, *Area Navigation (RNAV) Equipment Operational Requirements and Functional Requirements*, mandates carriage of RNAV equipment approved for RNP 5 operations (basic RNAV, or BRNAV) on the entire ATS route network in the ECAC area (see table below), including RNAV standard arrival and departure routes, beginning 23 April 1998. BRNAV can be accomplished through the use of VOR/DME, DME/DME, Omega or Omega/VLF, or INS with periodic updates. EUROCONTROL has also recently announced that it will approve GPS-based BRNAV.

While an exemption can be granted for “State aircraft,” NATO has agreed that all military aircraft flying as General Aviation Traffic (GAT) will comply. *Current navigation systems aboard Navy aircraft comply with BRNAV requirements.* Aircraft unable to meet BRNAV requirements will receive delayed routings via unfavorable routes, according to EUROCONTROL routing procedures. In the table below, note that France starts at FL 245 but plans to rapidly migrate to FL100.

Basic Area Navigation (BRNAV)		
Location	Flight Levels	When
Bosnia, Serbia	unknown	April, 1998
Cyprus, Greece, Hungary, Iceland, Italy, Malta, Morocco, Romania, Slovenia, Turkey	Ground & above	April, 1998

Basic Area Navigation (BRNAV) (continued)		
Location	Flight Levels	When
Belgium, Ireland, Luxembourg, Netherlands, Scotland, UK	FL100 & above	April, 1998
Denmark, Germany, Norway, Sweden	FL100+ (FL195 for domestic operations only) & above	April, 1998
Czech Republic	FL125 & above	April, 1998
Slovak Republic	FL135 & above	April, 1998
Austria, Bulgaria, Croatia, Poland, Switzerland	FL195 & above	April, 1998
Estonia, Finland, France, Latvia, Lithuania, Macedonia, Monaco, Portugal, Spain	FL245 & above	April, 1998

SURVEILLANCE

Mode S in Europe

After 1 January 2001, all new aircraft flying in European airspaces must carry a transponder capable of Mode S Level II with Downlink Aircraft Parameters (DAP) functionality. The EUROCONTROL mandate further requires that all aircraft be capable of Mode S Level II DAP functionality on 1 January 2003. “State aircraft” are exempt only if they fly as GAT “occasionally” which is defined as less than 30 hours per year.

While the goal of mandating Mode S functionality was to be in “harmonisation” with Traffic Collision Avoidance System (ACAS II in Europe) timelines, the ACAS II mandate for aircraft carrying 30 passengers or more or weighing 15,000 kg will be effective 1 January 2000. Further, the ACAS requirement migrates down to 19 passengers or 6700 kg on 1 January 2005. The intent of the harmonization effort was that an operator needed only the Mode S from the ACAS to comply with both mandates.

Mode S in Europe		
Requirement	Flight Levels	When
ACAS II for 30 pax ⁺ or 15000 kg		January 2000
Mode S LEVEL II new aircraft		January 2001
Mode S LEVEL II all aircraft		January 2003
ACAS II for 19 pax ⁺ or 6700 kg		January 2005